

ENERGY EFFICIENCY STUDY COMMITTEE

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Questions and Answers Regarding Energy Efficiency

Prepared by Iowa Utilities Board Staff

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Energy Efficiency Financing and Spending

How much money does each investor-owned utility (IOU) spend annually on energy efficiency (EE)? IOU spending for 2006 energy efficiency programs, the highest in its history, is summarized below.

Summary of IOU 2006 Energy Efficiency Spending

Utility	Program Category	Spending (\$)
Alliant/IPL	Electric EE	20,832,645
	Electric LM	24,609,413
	Gas EE	8,592,363
	Total	54,034,422
MidAmerican	Electric EE	19,350,964
	Electric LM	10,653,584
	Gas EE	18,181,424
	Total	48,185,972
Aquila	Gas EE	4,256,243
Atmos	Gas EE	35,242
Grand Total for All IOU Programs		106,511,878

How is this money collected? Do the utilities have a separate energy efficiency account? Utilities flow the costs and revenues for EE through a regulatory account. EE spending is collected or recovered from IOU retail electric and natural gas customers through surcharges on monthly energy use. Large natural gas customers are exempt from EE cost recovery because they buy their own gas from brokers and pay a fee to IOUs to “transport” the gas to them. These customers are excluded from participation in EE programs.

The EE charges are reviewed in annual reconciliations to ensure that IOUs do not overcollect or undercollect. The utilities submit data showing their expenditures and the amounts collected by the fixed surcharges, which are adjusted to compensate for EE spending beyond what was projected for the previous year. Note that overspending is not necessarily a sign the utility has been unreasonably inefficient. Higher levels of spending correlate very closely with higher levels of EE achievement.

Below is a table showing the current charges that IOUs use to recover the costs of energy efficiency. The table shows that customers pay the charges on a unit-of-energy basis. These charges are not shown directly on customers’ bills, but are combined with other volumetric charges included in utility bills.

IOU Energy Efficiency Cost Recovery Charges for 2007

MidAmerican Electric - \$/kWh

Rate Classes	East System	North System	South System
Residential	0.00212	0.00212	0.00212
Commercial	0.00118	0.00118	0.00118
Industrial	0.00118	0.00118	0.00118
Lighting	0.00011	0.00011	0.00011

MidAmerican Natural Gas - \$/therm

MidAmerican Rate Classes	East System	West System
Residential Small Volume Firm (SVF)	0.03844	0.03844
Non-Residential SVF	0.01185	0.01185
Medium Volume Firm (MVF)	NA	0.01185
Large Volume Firm (LVF)	NA	0.01185
Interruptible	NA	0.01185
Seasonal	NA	0.01185

Alliant/IPL Electric \$/kWh and Natural Gas \$/therm

Rate Classes	Electric EE Charges	Natural Gas EE Charges
Residential and Farm	0.0050	0.0643
General Service (Commercial)	0.0030	0.0124
Large General Service (Industrial)	0.0023	0.0141
Lighting or Other	0.0027	NA
Bulk Supply	0.0022	NA

Aquila Natural Gas

Aquila Rate Classes	EE Charges
General Service	0.03982
Non-General Service	0.00438
Transportation	0.0000

Does interest accumulate on this money? The EE surcharges of the IOUs are intended to produce an amount of monthly revenue that should match ongoing expenditures and retire unrecovered costs or return excess to customers. The utilities do not earn interest on balances in excess of expenses. The utilities often experience a lag of several months between larger expenditures and recovery of costs, which costs them the time value of the money they “advance” for the cost, but IOUs are not allowed to recover carrying charges if revenues lag expenses.

Duplication

What duplication, if any, occurs in the administration and implementation of EE programs? Several types of duplication are possible, including:

- Duplication among IOUs in developing EE plans
- Duplication in operating similar programs among IOUs which share service territories
- Duplication among IOUs, Munis and RECs which share service territories

In order to avoid duplication for the development of EE plans, the IOUs have jointly funded the extensive research needed to characterize EE technologies and develop estimates of EE potential. In 2002 and 2003, the IOUs worked through the Iowa Utility Association to retain a common consulting team which prepared a Joint Assessment of Potential. A similar effort is underway at this time for the three major IOUs.

The IUB and OCA have been concerned from the start that there would be duplication of program promotion and operation. At the time the first EE plans went into effect, ten investor-owned utilities operated in Iowa, and each of those utilities was required to develop, file and implement an EE plan. Subsequent consolidation in the Iowa utility industry has reduced that number to four IOUs.

In its EE rules the IUB requires that IOUs coordinate plans and programs with other utilities. 199 IAC Chapter 35 states:

35.8(9) *Coordination with other utilities and participation in plan preparation.*

The utility shall provide the following reports:

- a. A report which explains the results of attempts to coordinate energy efficiency programs with other gas or electric utilities sharing its service territory within the boundaries of incorporated municipalities having a population of 1000 or more individuals.
- b. A report on the participation of interested persons in the preparation of the assessment of potential and energy efficiency plan pursuant to subrules 35.8(1) and 35.8(2). The report shall identify the persons with whom the utility consulted, the date and type of meetings held or other contacts made, and the results of the meetings and contacts.

Subsequent to the approval of IOU EE plans in 2003, the IOUs conducted two rounds of a statewide promotion of energy efficient lighting, called "Change a Light – Change the World." The campaign in 2006 included Alliant/IPL, MidAmerican Energy and 16 Munis and RECs. This year, the 2007 campaign was expanded to include 56 IOUs, Munis, and RECs. In addition, Alliant/IPL, Aquila and Atmos Energy have worked together to share costs and implement the school-aged education program, Living Wise.

What is the cost of duplication? Program administrative costs show the most potential for overlap. However, not all the costs for Muni and REC program administration will overlap with IOU programs. Some of the Munis' and much of the RECs' service areas do not overlap with those of the IOUs. If a program is operated by only one utility at a time in a given area, there can be no duplication. Also, some of the Munis and RECs that operate programs in towns and counties where there is service area overlap may not be offering the same programs, which should also reduce duplication of administrative costs.

There is little potential for duplication or double payment of incentives among the IOUs, Munis and RECs. IOUs probably share the greatest number of customers with Munis, but the amount of incentives paid by municipal utilities is small, providing little economic opportunity for duplicate incentives.

Some IOU programs might offer customers occasional opportunities for duplicate incentives. However, the IOUs very early established formal and informal procedures to reduce or eliminate such duplication of incentives. The IOUs limit exposure to duplication of incentives by requiring that residential energy audits be provided by the utility which supplies the primary heating fuel, whether electricity or natural gas.

What is the potential for duplication of administration, promotion, or monitoring and evaluation? There may be potential opportunities for duplication among the IOUs, and some slight potential for duplication among IOUs, Munis and RECs. However, IUB directives and IOU procedures are in place to reduce the most likely actual instances of duplication.

Marketing

How much does each IOU spend on promoting or marketing its energy efficiency program? IOUs spent about \$4.8 million in 2006 on marketing or advertising and promotion of their energy efficiency programs. This represents about 4.4 percent of total EE spending in 2006. This includes mass marketing in print and broadcast media, targeted marketing such as bill stuffers, and other marketing activities.

IOU 2006 Spending on Advertising and Promotion

Utility	Electric EE	Electric LM	Natural Gas EE	Company Totals
Alliant/IPL	1,616,215	80,609	425,073	2,121,896
MidAmerican	1,197,965	445,209	997,136	2,640,310
Aquila, Inc.	0	0	0	0
GRAND TOTAL	2,814,180	525,818	1,422,209	4,762,206

How does this compare to Munis and RECs?

The data for Munis and RECs does not allow estimation of marketing costs. It should be fair to say that marketing is a significant part of the more than \$2.6 million spent by RECs and the more than \$1.3 million spent by Munis on administrative costs.

Is there duplication of marketing efforts?

There may be some potential for duplication in marketing among IOUs and among IOUs, Munis and RECs. However, it is not clear that duplication of marketing amounts to redundancy in impacts or costs. Mass marketing is the most likely area where advertising efforts could overlap, but mass marketing of one utility's energy efficiency programs may help reinforce awareness of and interest in all utilities' programs.

Accountability

How are energy efficiency savings calculated? Calculation of energy savings from efficiency is part of IOUs' development of EE plans, monitoring of programs and evaluation of results. The calculations performed are best estimates using values derived from research to approximate the effects of advanced technologies on energy use. The alternative to the estimation process is to engage in direct measurement of EE savings, via metering of pre- and post-installation energy use by individual customers, which may easily require monitoring of individual energy end-uses. Direct measurements are intrusive, expensive and also subject to error and interpretation.

The IUB rules for IOU EE plans require detailed descriptions of the calculation parameters used by the utilities. The rules specify that EE savings be listed for the EE measures identified in the assessment of potential and for the EE measures incorporated into each utility program.

The critical parameters (measurements) for calculating EE savings are the "measure" characteristics, including estimated average kW, kWh, therms, and peak day therms saved by EE measures as they are applied to specific energy end uses. An EE measure must be compared to a less efficient energy-using measure of some type, requiring estimation of the size and efficiency of the existing (old) technology. The energy and capacity savings depend very much on the specific application. Residential and commercial buildings may be complicated and may require numerical modeling of the entire structure. For example, Quantec, the IOU consultant employed in the development of the current IOU plans, created a set of typical residential structures using well-known energy modeling software, and then applied the various measures to these typical house types to find the estimated energy savings.

The table below is an excerpt of installed EE measures from the Alliant/IPL Annual Report for 2006

Customer Type R or Non	Program	Rebate Type	Year	Service Type	Accounts	Units	Customer Incentive \$	Dealer Spiff	kW	kWh	Therm	
Res	3: Res Home Audits	HEA - CFL	2006			0	17,668	123,676	0	176.5	1,077,748	0
Res	3: Res Home Audits	HEA - Faucet Aerator	2006			0	4,974	17,409	0	0.0	74,880	30,758
Res	3: Res Home Audits	HEA - Home Audit	2006		3,275	3,275	378,350	0	0.0	0	0	0
Res	3: Res Home Audits	HEA - Low Flow Shower Head	2006		0	2,505	16,909	0	0.0	105,860	23,412	0
Res	3: Res Home Audits	HEA - Pipe Insulation	2006		0	2,006	6,018	0	0.0	9,520	22,971	0
Res	3: Res Home Audits	HEA - Prog Thermostats	2006		0	768	61,440	0	138.5	190,524	64,490	0
Res	3: Res Home Audits	HEA - Water Heater Wrap	2006		0	335	6,365	0	0.0	15,047	6,174	0
Res	3: Res Home Audits	HEA - Mid Am Shared Insulation	2006		0	0	50,084	0	169.0	196,515	0	0
Res	3: Res Home Audits	Insulation	2006	ELECTRIC	107	111	50,060	566	19.6	287,813	0	0
Res	3: Res Home Audits	Insulation	2006	ELECTRIC_GAS	1,437	1,514	722,442	23,391	294.4	584,610	294,238	0
Res	3: Res Home Audits	Insulation	2006	GAS	483	496	229,015	5,369	0.0	0	87,224	0
3: Res Home Audits Total					5,302	33,652	1,661,769	29,325	798.0	2,542,517	529,267	0

How do our utilities determine cost-effectiveness of energy efficiency programs? Cost-effectiveness is probably the most essential determinant of whether an energy efficiency program should be pursued or how the program is working. The Iowa General Assembly directed that certain benefit-cost tests be applied to the IOU energy efficiency plans, with specific exceptions.

476.6 Changes in rates, charges, schedules, and regulations - supply and cost review - water costs for fire protection.

14. *Energy efficiency plans.* Electric and gas public utilities shall offer energy efficiency programs to their customers through energy efficiency plans. An energy efficiency plan as a whole shall be cost-effective. In determining the cost-effectiveness of an energy efficiency plan, the board shall apply the societal test, utility cost test, ratepayer impact test, and participant test. Energy efficiency programs for qualified low-income persons and for tree planting programs need not be cost-effective and shall not be considered in determining cost-effectiveness of plans as a whole.

The benefit-cost tests are further defined in IUB rules:

199—35.2(476) Definitions. The following words and terms, when used in this chapter, shall have the meanings shown below:

“Benefit/cost ratio” means the ratio of the present value of benefits to the present value of costs.

“Benefit/cost tests” means one of the four acceptable economic tests used to compare the present value of applicable benefits to

the present value of applicable costs of an energy efficiency program or plan. The tests are the participant test, the ratepayer impact test, the societal test, and the utility cost test. A program or plan passes a benefit/cost test if the benefit/cost ratio is equal to or greater than one.

“Net societal benefits” means the present value of benefits less the present value of costs as defined in the societal test.

These definitions emphasize a critical characteristic of EE: the benefits and costs must be expressed in present value. The benefits of EE extend far into the future, but almost all costs are incurred up-front, in the form of dollars expended to make the EE investment. A comparison of these immediate costs to only the first year of energy and capacity savings would yield misleading results. Because EE savings extend into the future, these savings must be discounted to a present value. The reason that there are four (or in some cases, five) benefit-cost tests is that the net value of EE varies depending on the “perspective” or the economic position of the entity under consideration.

A quick view of the various tests and the key parameters can be seen in the table below, derived from the source document for the 1990 legislation that established the IOU EE programs.

Components of IOU Benefit-cost Tests

Perspective	Cost Components				Benefit Components			
	Program Costs (Admin)	Customers Rebates/ Incentives	Utility Revenue Decreases	Participant Incremental Costs	Savings in Utility Fuel \$	Avoided Plant Investment	Customer Rebate/ Incentive	Customer Utility Bill Reduction
Participant				X			X	X
Rate-payer	X	X	X		X	X		
Utility	X	X			X	X		
Societal	X			X	X	X		

Some of the IOU benefit-cost calculations are included as examples of how the various tests are performed. The MEC 2006 Residential Equipment Program Table below shows a summary of the calculations for each of the tests, for electric and gas benefits and costs. Note the additional test included by MEC, titled “Total Resource Cost” test. This test is identical to the Societal test in that it

includes the cost components of program costs and participant incremental costs and the benefits of savings for utility fuel and avoided plant investment. However, the Total Resource Cost test does not include externality benefits.

MEC Benefit-Cost Results for the 2006 Residential Equipment Program

		Test Perspective and Discount Rate				
		Participant	Utility	Ratepayer Impact Measure	Total Resource Cost	Societal
		8.16%	8.16%	8.16%	8.16%	5.18%
Summary - Electric & Gas						
	B/C Ratio	1.861	1.280	0.523	0.918	1.195
	Net Benefits (\$)	5,816,355	1,545,951	-6,447,868	-631,513	1,504,348
	Total Benefits (\$)	12,568,295	7,063,477	7,063,477	7,063,477	9,199,338
	Total Costs (\$)	6,751,940	5,517,526	13,511,345	7,694,990	7,694,990
Summary - Electric Only						
	B/C Ratio	1.672	1.067	0.522	0.827	1.087
	Net Benefits (\$)	1,771,066	156,311	-2,292,834	-521,767	263,223
	Total Benefits (\$)	4,408,033	2,502,522	2,502,522	2,502,522	3,287,513
	Total Costs (\$)	2,636,967	2,346,212	4,795,356	3,024,290	3,024,290
	Levelized Cost (\$/kWh)	0.047	0.042	0.085	0.054	0.045
Summary - Gas Only						
	B/C Ratio	1.983	1.438	0.523	0.977	1.266
	Net Benefits (\$)	4,045,289	1,389,640	-4,155,035	-109,746	1,241,125
	Total Benefits (\$)	8,160,262	4,560,955	4,560,955	4,560,955	5,911,825
	Total Costs (\$)	4,114,973	3,171,314	8,715,989	4,670,700	4,670,700
	Levelized Cost (\$/therm)	0.550	0.424	1.165	0.624	0.521
Benefit Components (\$)						
	Customer Electric Bill Decrease	2,449,144				
	Customer Gas Bill Decrease	5,544,675				
	Customer Rebates Received	1,958,889				
	Customer Rebates Received	2,615,587				
	MEC Electric Production Savings		1,094,924	1,094,924	1,094,924	1,384,126
	MEC Capacity Savings		1,407,599	1,407,599	1,407,599	1,675,094
	MEC Gas Acquisition Cost Savings		4,560,955	4,560,955	4,560,955	5,526,146
	Externalities - Electric					228,293
	Externalities - Gas					385,678
Cost Components (\$)						
	Incremental Participant Cost	2,636,967			2,636,967	2,636,967
	Incremental Participant Cost	4,114,973			4,114,973	4,114,973
	MEC Electric Revenue Decrease			2,449,144		
	MEC Gas Revenue Decrease			5,544,675		
	MEC Administrative Costs - Electric		387,323	387,323		387,323
	MEC Administrative Costs - Gas		555,727	555,727		555,727
	MEC Rebates Paid - Electric		1,958,889	1,958,889		
	MEC Rebates Paid - Gas		2,615,587	2,615,587		

These benefits and costs are based on the present value of the future stream of savings and costs. The next tables display the flow of these future benefits and costs, and the present value results of discounting the future values. Note the discount rates vary according to the test perspective.

Stream of Costs and Benefits Calculation for MEC Residential Equipment Program for 2006

56,141	18	748,115	10,870	6,751,940	2,449,144	5,544,675	
67,942		896,832		6,751,940			385,678

Energy Savings MWh	Demand Savings MW	Gas Energy Savings MMBtu	Gas Peak Day Savings MMBtu	Part. Cost (Electric and Gas) \$	Electric Bill Savings \$	Gas Bill Savings \$	Externalities (Gas Only) \$
0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
5,654.131	1.941	76,666.00	1,112.00	6,751,940.00	224,725.60	505,767.53	28,673.19
5,654.131	1.941	76,666.00	1,112.00	0.00	224,725.60	505,767.53	29,976.52
5,654.131	1.941	76,666.00	1,112.00	0.00	224,725.60	505,767.53	30,666.52
5,654.131	1.941	76,666.00	1,112.00	0.00	230,343.74	518,411.72	30,743.18
5,654.131	1.941	76,666.00	1,112.00	0.00	236,102.33	531,372.02	31,203.18
5,654.131	1.941	76,666.00	1,112.00	0.00	242,004.89	544,656.32	31,586.51
5,654.131	1.941	76,666.00	1,112.00	0.00	248,055.01	558,272.72	32,123.18
5,654.131	1.941	76,666.00	1,112.00	0.00	254,256.39	572,229.54	32,123.18
5,654.131	1.941	76,666.00	1,112.00	0.00	260,612.80	586,535.28	32,046.51
5,654.131	1.941	76,666.00	1,112.00	0.00	267,128.12	601,198.66	33,733.17
5,654.131	1.941	76,666.00	1,112.00	0.00	273,806.32	616,228.63	34,346.50
5,654.131	1.941	76,666.00	1,112.00	0.00	280,651.48	631,634.35	35,113.16
5,595.976	1.846	76,666.00	1,112.00	0.00	282,027.08	647,425.20	36,033.16
5,589.197	1.845	76,666.00	1,112.00	0.00	288,477.14	663,610.83	37,029.82
4,302.735	0.315	74,650.00	1,104.00	0.00	188,040.65	662,315.00	37,175.86
3,620.114	0.315	74,526.00	1,100.00	0.00	153,813.39	677,741.94	38,306.35
3,620.114	0.315	74,526.00	1,100.00	0.00	157,658.73	694,685.49	39,573.29
3,620.114	0.315	2,292.00	34.00	0.00	161,600.20	21,898.43	1,258.29
3,620.114	0.315	2,292.00	34.00	0.00	165,640.20	22,445.89	1,304.13
3,620.114	0.315	2,292.00	34.00	0.00	169,781.21	23,007.04	1,347.68
0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00

The IOU benefit-cost tests provide an accurate portrayal of the present value of EE programs from various perspectives at a given point in time. There are a number of points that must be kept in mind when viewing these tests:

- The Ratepayer test is used primarily to estimate the impact of energy efficiency programs upon the ratepayers who do not participate in any program in a given year. However, many of these ratepayers have participated or will participate in a program in some year, and thus will improve their energy efficiency and begin saving money.
- If the Ratepayer test were to be used to determine which EE programs should be implemented, most programs would fail, because most EE programs will increase rates to pay for the recovery of costs. Similarly, if the Ratepayer test were used to determine whether a power plant should be built, that project would fail because rates would likely increase.
- If a Ratepayer never participates in a program, but continues to be charged some additional cost as part of recovery of EE costs, the Ratepayer will still benefit from EE programs that reduce future costs to the utility. Doing nothing, that is, not implementing an EE program, will force all ratepayers to pay more for future generating plants (electric services) and fuel (electric and gas service).

- The benefits of EE programs used in the Societal test are the avoided costs to the utility. These avoided costs are less than the Participant benefits, because the participant benefits are based on “retail” energy costs while the utility avoided costs are effectively “wholesale” amounts.

The IOUs’ plan produced the following benefit-cost ratios and net benefits:

Societal Benefits and Costs for 2006

IOU Program Types	Societal Benefits (\$ Million)	Societal Costs (\$ Million)	Societal Net Ben. (\$ Million)	Soc. B/C Ratio
Electric LM	486	240	245	2.02
Electric EE	216	96	120	2.24
Gas EE	82	50	32	1.63
All LM + EE	784	387	397	2.03

During the first Interim Committee meeting of October 18, 2007, IUB staff was asked to provide estimated costs for new power plants. The IOUs provided costs for power plants per IUB rules that require capacity costs based on a combustion turbine “peaking” plant.

- MidAmerican estimated its costs as a present worth of total revenue requirements for a combustion turbine, amounting to \$694 per kW in 2004.
- Alliant/IPL estimated its costs as present value of revenue requirements for a combustion turbine, amounting to \$535 per kW in 2005.

The value of avoiding a power plant is considerable, but avoiding the fuel and operating costs to produce electricity or avoiding purchase of the gas distributed to customers is also valuable. If EE programs can be implemented for less than the costs of capacity and energy in the future, programs will be cost-effective. IUB staff has extracted or estimated from IOU reports the avoided costs used to determine the benefits of EE for current plans and programs, as follows:

Alliant/IPL Avoided Costs (Data response filed July 27, 2007)

Electric Capacity

\$/kW-year	\$	127.46
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Electric Energy

Summer On Pk (kWh)	\$0.0655
Summer Mid Pk (kWh)	\$0.0453
Summer Off Pk (kWh)	\$0.0338
Winter On Pk (kWh)	\$0.0573
Winter Mid Pk (kWh)	\$0.0400
Winter Off Pk (kWh)	\$0.0281

Natural Gas Peak Day Capacity

\$/Therm-year	\$	8.15
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Natural Gas Energy

On Peak	\$	0.44
Off Peak	\$	0.41

Aquila Avoided Costs (Docket No. EEP-03-4, filed March 31, 2003)

Peak Day Demand cost (2004) ----- = \$3.40 per Pk-day Therm
Peak Day Demand cost for 2006, including inflation = \$3.57 per Pk-day Therm
Gas energy cost (2004) ----- = \$0.41 per Therm (Winter)
Gas energy cost for 2006, including inflation ---- = \$0.43 per Therm (Winter)

MidAmerican avoided costs were filed confidentially; however, its costs are similar but not identical to Alliant/IPL costs and Aquila costs.

In the discussion during the October Interim Committee meeting, IUB staff was asked what the cost of EE might be on a dollars per kW or cents per kWh basis. Staff compiled from the IOU reports information on "levelized costs," that is, the up-front costs for implementing energy efficiency, from various perspectives, spread over the entire stream of kW, kWh or therms saved by the energy efficiency measures.

Recall that utilities calculated the effects of the EE measures installed in a particular year by estimating savings for the entire lifetime of the energy efficiency measures. Levelized cost spreads the cost over all of the future kW, kWh or therms, using discounting to obtain a present value for the future savings. The table below shows an example of levelized costs for all EE programs combined for MidAmerican.

MEC Levelized Costs for all Electric and Gas Savings from Programs Implemented in 2006

MEC 2006 All Programs Combined	Electric Levelized Energy Costs \$ per kWh	Electric Levelized Capacity Cost \$ per kW (NONRES Load Management only)	Natural Gas Energy Levelized Cost
Participant	\$0.023	\$ 3.01	\$0.56
Utility	\$0.017	\$ 56.63	\$0.38
Ratepayer	\$0.071	\$ 57.33	\$1.14
Societal	\$0.025	\$ 11.41	\$0.51

Similar numbers can be seen for individual programs implemented by Alliant/IPL and Aquila, although those companies did not estimate total plan levelized costs.

Cost-effectiveness calculations by municipal utilities and RECs:

Although cost-effectiveness is required in the statutes for all utilities, the IUB has no authority over the rates of Munis and RECs. The IUB does not evaluate or

approve EE plans filed by Munis and RECs. Under these circumstances, and considering the costs needed to perform benefit-cost testing, the IUB has not required such analyses in Muni and REC plans. These plans are in the nature of reports on voluntary programs conducted by Munis and RECS.

In order to obtain as accurate a picture as possible for the Munis and RECs, the Board required these utilities to include estimates of benefits and costs in their reports filed under Docket No. NOI-07-2, the current IUB Inquiry into Energy Efficiency Programs. These calculations were filed, and utilities such as Cedar Falls show good benefit-cost ratios, with a Societal test B/C of 1.14 for electric programs and 1.43 for gas programs. However, the effort to compile all the results for the Municipal utilities and RECs is very time-consuming, especially for items like benefits and costs, which have not traditionally been a part of reports. Thus there are no aggregated overall numbers for these utilities.

In addition, many programs operated by Munis and RECs are educational in nature, with unquantifiable benefits. Thus the results would not provide any real increase in knowledge about benefit-cost results, beyond what can be gleaned from simply reading and compiling the results of Muni and REC programs in terms of savings of kW, kWh, therms and dollars.

What measures do utilities use? EE experts use the word “measure” to signify an individual item of EE technology. However, statistical or academic jargon uses the term “measures” to mean quantities such as dollars or kilowatt-hours, or compound results such as dollars per kilowatt-hour. IUB staff will try to use the terms “estimate (as a noun),” “calculation,” or “savings” to describe the dimensions of EE results and will use the term “EE measure” to describe the energy using equipment, building component, or operational change which produces the energy efficiency savings.

2006 Cost Effectiveness Results for IOUs

IOU COST EFFECTIVENESS RESULTS - 2006				
Societal Test	Benefits (\$ PV)	Costs (\$ PV)	Net Benefits (\$ PV)	B/C Ratio
IPL Load Management	285,396,807	180,986,750	104,410,057	1.58
IPL Electric En Effic	135,595,669	53,101,652	82,494,017	2.55
IPL Gas En Effic	27,804,842	13,738,648	14,066,194	2.02
IPL Total En Effic E+G	163,400,511	66,840,300	96,560,211	2.44
IPL Total DSM B/C	448,797,318	247,827,050	200,970,268	1.81
MEC Load Management	200,300,086	59,250,458	141,049,628	3.38
MEC Electric En Effic	80,127,952	43,006,316	37,121,636	1.86
MEC Gas En Effic	40,623,296	30,307,693	10,315,603	1.34
MEC Total En Effic E+G	120,751,248	73,314,009	47,437,239	1.65
MEC Total DSM	321,051,334	132,564,467	188,486,867	2.42
Aquila Gas En Effic	13,849,655	6,474,889	7,374,765	2.14
IOU Load Management	485,696,893	240,237,208	245,459,685	2.02
IOU Electric En Effic	215,723,621	96,107,968	119,615,653	2.24
IOU Gas En Effic	82,277,792	50,521,230	31,756,562	1.63
IOU Total En Effic E+G	298,001,414	146,629,198	151,372,216	2.03
IOU Total DSM	783,698,307	386,866,406	396,831,901	2.03

Energy Efficiency Programs

What are the similarities and differences between the IOU energy efficiency programs?

General Similarities: By statute, all IOUs provide funding for tree planting and low-income weatherization. In addition, the IOUs increased funding for low-income programs, prepared a report on low-income energy efficiency, and developed new programs for low-income customers because of Board orders approving EE plans. All the IOUs provide funding for the Iowa Energy Center and the Center for Global and Regional Environmental Research, and have jointly participated in development of educational programs in cooperation with

the Iowa Energy Center. All of the IOU programs are based on a common set of energy efficiency measures developed as part of the Joint Assessment of Potential.

Electric Energy Efficiency

Similarities:

- Both IOUs offer prescriptive rebates for residential customers, consisting of a list of approved EE measures.
- Both IOUs offer residential new construction programs, targeting builders for rebates. Both IOUs have worked to match the program and measure requirements, to make the program easier for builders.
- Both IOUs offer similar residential home audits through contracts with the same third party provider (based in Iowa).
- Both IOUs participated, along with some RECs and Munis in the "Change a Light" statewide campaign to encourage installation of compact fluorescent and other fluorescent lights.
- Both IOUs offer rebates for specific nonresidential EE measures, on a per-measure basis.
- Both IOUs offer technical assistance and incentives for nonresidential custom projects, which require evaluation of the projects by the utilities' in-house engineering staff.
- Both IOUs offer technical assistance and incentives for nonresidential new construction, using as a program contractor the same non-utility architecture and engineering firm to assist customers with the energy-efficient design of new buildings.

Differences:

- Alliant/IPL offers residential customers an appliance recycling program for old or redundant refrigerators and freezers for removal and recycling.
- Alliant/IPL offers a performance contracting program to nonresidential customers.
- Alliant/IPL offers an agricultural program which provides expert assistance and rebates to farmers and agricultural enterprises. It also helps farmers develop grant applications to apply to the U.S. Department of Agriculture for grants for EE and renewable energy projects.
- MidAmerican and Alliant/IPL offer small commercial audit programs targeting small commercial customers.
- MidAmerican offers the nonresidential energy analysis program for large, existing commercial and industrial buildings and manufacturing processes.
- MidAmerican uses a program contractor for program and project management services.
- MidAmerican offers large nonresidential customers the efficiency bid program, which allows customers to develop projects and then compete to obtain incentives based on the best cost per savings.

IOU Electric Load Management Programs

Similarities: Residential load management for both Alliant/IPL and MidAmerican is accomplished by sending signals (via radio or pager) to switches to shut down part of a customer's air conditioning system on peak demand days with high temperatures and humidity. During an actual event, a participating customer's air conditioner compressors may be shut down for parts of an hour, while the indoor fan continues to operate. Customers receive incentives in the form of bill credits for participating. Both utilities have had to replace substantial numbers of failed switches in order to maintain the potential interruptibility of the air conditioners.

Utilities accomplish nonresidential load management by calling participating customers and asking them to reduce their electricity use to pre-determined levels. The customers are typically large institutional and industrial electricity users, who shut down parts of their operations in response to the calls. The events can be triggered by the need to reinforce the reliability of utility transmission systems, due to either local emergencies (ice storms) or region-wide system constraints. Events can also be triggered by monitoring of the regional grid (Midwest Independent System Operator or MISO), to determine when short-term prices for electricity are increasing to a level which could impact company economics or reliability.

Differences: The main differences between Alliant/IPL and MidAmerican are in the types of nonresidential incentives. At the end of summer, MidAmerican pays customers a specific amount per peak kilowatt subscribed for interruption. Alliant/IPL provides an incentive rate structure for its participating nonresidential customers.

IOU Natural Gas Energy Efficiency Programs

Similarities:

- All three IOUs offer prescriptive rebates for residential customers, consisting of a list of approved EE measures. Aquila offers these measures through several residential programs targeting sets of measures, such as envelope measures, water heating or furnace replacement.
- All three IOUs offer residential new construction programs, targeting builders for rebates. IOUs have worked to match the program and measure requirements, to make the program easier for builders.
- IOUs offer similar residential home audits through contracts with a third party provider (based in Iowa).
- All three IOUs offer rebates for specific nonresidential energy efficiency measures, on a per-measure basis.
- All three IOUs offer technical assistance and incentives for nonresidential custom projects
- Alliant/IPL and MidAmerican offer technical assistance and incentives for nonresidential new construction, using as a program contractor the same non-utility architecture and engineering firm to assist customers with the

energy-efficient design of new buildings. Aquila addresses the types of measures used in new construction (walls, windows, etc.) through its commercial and industrial custom rebates.

Differences: Most programs of Alliant/IPL and MidAmerican which address electric energy efficiency also address natural gas efficiency, except for the Alliant/IPL residential appliance recycling program. Of course, the electric load management programs do not address natural gas use.

Aquila includes as programs a number of educational and informational programs and some direct installation programs that result in small but noticeable natural gas savings. For example, Aquila provides incentives to homes built through Habitat for Humanity; seven homes benefited from this assistance in 2006.

What are the similarities and differences between the IOU, REC and Muni EE programs for both residential and commercial buildings? For example, do they all offer rebates and energy audits?

Similarities: The IOUs, RECs and Munis recognize that because EE needs and opportunities differ among customers, programs must be tailored to customer segments and technologies. All of the utilities are constrained by the need to achieve cost-effective programs. Smaller utilities may be limited by budgets.

Thus, the consistency of market segment opportunities leads many utilities to a limited roster of programs with apparent similarities. Almost all IOUs, RECs and Munis with significant energy efficiency efforts include energy audits and rebates for residential customers; technical assistance and rebates for nonresidential customers; some form of loans; and general educational or promotional efforts.

Which programs have the highest cost-effectiveness?

Electric EE Programs:

Electric Energy Efficiency Programs	Benefit/Cost Ratio Of Program	Cost Of Program	Megawatt Hours Saved by Program
Alliant/IPL			
Residential--Appliance Recycling	11.9	\$502,645	5,633
Residential--Low Income	7.6	\$573,612	2,025
Residential--New Construction	5.2	\$1,313,119	3,302
Residential--Audit	4.5	\$924,016	2,543
Non-Residential--Performance Contracting	4.3	\$1,729,621	9,044
Residential--Prescriptive Rebates	2.5	\$13,165,468	19,044
Non-Residential--Prescriptive Rebates	2.4	\$3,080,740	5,700
Non-Residential--Custom Rebates	2.2	\$26,880,018	65,786

Non-Residential--Agriculture	2.1	\$2,626,203	4,334
Non-Residential--New Construction	1.1	\$2,306,210	3,134
MidAmerican			
Non-Residential--Efficiency Bid	2.8	\$1,729,748	11,896
Non-Residential--Equipment	2.7	\$11,509,374	63,540
Residential--Audit	2.6	\$2,168,552	15,467
Non-Residential--New Construction	2.3	\$7,868,709	34,067
Residential--New Construction	1.8	\$6,410,148	9,870
Residential--Low Income	1.7	\$405,736	1,996
Non-Residential--Custom Rebates	1.4	\$1,056,247	3,289
Non-Residential--Energy Analysis	1.3	\$1,878,120	5,621
Non-Residential--Audit	1.3	\$801,195	3,033
Residential--Equipment	1.1	\$3,024,290	5,654

Natural Gas EE Programs:

Natural Gas Energy Efficiency Programs	Benefit/Cost Ratio Of Program	Cost Of Program	Millions of Cubic Feet Of Natural Gas Saved by Program
Alliant/IPL			
Non-Residential--Performance Contracting	16.8	\$136,854	20
Residential--Audit	3.3	\$1,928,809	53
Non-Residential--Prescriptive Rebates	2.3	\$1,107,831	21
Non-Residential--Custom Rebates	1.9	\$1,491,756	24
Residential--Low Income	1.8	\$1,399,746	20
Residential--Prescriptive Rebates	1.6	\$5,780,430	85
Residential--New Construction	1.5	\$1,525,880	18
Non-Residential--New Construction	-0.7	\$367,342	-2
MidAmerican			
Non-Residential--New Construction	3.0	\$722,586	29
Residential--Low Income	1.7	\$1,408,753	31
Residential--Audit	1.6	\$5,648,074	94
Non-Residential--Audit	1.6	\$1,120,904	18
Non-Residential--Equipment	1.5	\$904,995	18
Non-Residential--Custom Rebates	1.5	\$934,813	16
Residential--Equipment	1.3	\$4,670,700	77
Residential--New Construction	1.2	\$13,793,493	172
Non-Residential--Efficiency Bid	1.1	\$139,509	1
Non-Residential--Energy Analysis	0.2	\$143,454	0

Aquila

Residential--Setback Thermostat & Furnace Maintenance	5.1	\$381,087	41
Non-Residential--Custom Rebates	3.6	\$467,297	14
Non-Residential--Audit	2.8	\$526,433	0
Residential--Envelope Measures Retrofit	2.5	\$1,615,795	38
Residential--Water Heater Replacement	2.3	\$36,745	1
Residential--Furnace Replacement	2.1	\$1,403,404	28
Residential--New Construction	1.6	\$542,561	8
Residential--Energy Audits	1.5	\$353,800	11
Residential--School-Based Energy Education	1.5	\$52,992	2
Residential--Innovative Space & Water Heating Technology	1.1	\$150,938	2
Non-Residential--Prescriptive Rebates	0.0	\$84,566	16
Residential--Low-Income Weatherization	0.0	\$445,799	3

Recipients

What percent of EE annual spending goes to new construction? The total of New Construction spending as a percentage of all IOU spending is about 16 percent.

Utility	RES and NONRES	Spending for	Spending
	New Construction	2006 (\$)	As % of
			Util. Total \$
Alliant/IPL	Res New Construction - EL	1,081,203	2.00%
	Nonres New Construction - EL	1,039,357	1.92%
	Res New Construction - Gas	947,357	1.75%
	Nonres New Construction - Gas	176,890	0.33%
	Total IPL EL EE+LM+Gas EE	54,034,422	NA
MidAmerican	Res New Construction - EL	2,750,994	5.71%
	Nonres New Construction - EL	3,977,006	8.25%
	Res New Construction - Gas	6,224,775	12.92%
	Nonres New Construction - Gas	461,595	0.96%
	Total MEC EL EE+LM+Gas EE	48,185,972	NA
Aquila	Res New Construction - Gas	296,427	6.96%
	Nonres Custom - Unknown	0	NA
	Total Aquila EE Spend	4,256,243	NA
Atmos	NO Program	0	NA
	NA	0	As % of
IOU New Construction Totals			All IOU \$
Totals	Electric	8,848,560	8.31%
Totals	Gas	8,107,044	7.61%
Grand Total of EE Electric + Gas		16,955,604	15.92%
Grand Total EE + LM Spending		106,511,878	NA

What percent of EE spending goes to commercial and residential buildings that are five years of age and newer? Ten years of age and newer? IUB staff asked the IOUs to estimate their spending for 2006 by vintage of structure. None of the utilities could extract age information for the category 10 years and older, although Alliant/IPL estimated that about \$4.9 million or about nine percent of its spending went to buildings older than 1978. Alliant/IPL also estimated about \$2.1 million or about 4 percent of total spending went to low-income homes, which are almost certainly older than 10 years.

1. Vintages of Buildings Participating in IOU Energy Efficiency

MidAmerican Residential EE Spending in 2006 - Older vs. Newer Homes

Homes over 5 years old

Program	Electric	Gas	Total
Residential Equipment	\$2,058,096	\$2,781,876	\$4,839,972
Residential Audit	\$1,909,414	\$3,893,666	\$5,803,080
Low-Income	\$417,201	\$1,833,830	\$2,251,031
Residential New Construction	\$0	\$0	\$0
Residential Load Management	\$2,776,073	\$0	\$2,776,073
Totals	\$7,160,784	\$8,509,372	\$15,670,156

Percentage of spending on homes over 5 years old = 62%.

Homes under 5 years old

Program	Electric	Gas	Total	2006 Grand Totals
Residential Equipment	\$288,115	\$389,437	\$677,552	\$5,517,524
Residential Audit	\$0	\$0	\$0	\$5,803,080
Low-Income	\$0	\$0	\$0	\$2,251,031
Residential New Construction	\$2,750,994	\$6,224,775	\$8,975,769	\$8,975,769
Residential Load Management	\$146,109	\$0	\$146,109	\$2,922,182
Totals	\$3,185,218	\$6,614,212	\$9,799,430	\$25,469,586

Percentage of spending on homes under 5 years old = 38%.

MidAmerican Notes:

1. These numbers are inclusive of all categories of program spending.
2. Residential Equipment was derived by taking the percentage of customer rebates paid to newer homeowners and applying that percentage to total program spending in 2006.
3. By definition, all Residential Audit spending is in homes at least 10 years old, so there is no spending on newer homes.

4. It is highly unlikely that a newer home would qualify for low-income weatherization services through the Department of Human Rights. Therefore, all spending is on older homes.
5. By definition, all Residential New Construction spending is in homes less than 5 years of age.
6. Residential Load Management numbers are estimated at 5% for newer homes and 95% for homes over 5 years old.

MidAmerican Nonresidential EE Spending in 2006 - Older vs. Newer Buildings

Buildings over 5 years old

Program	Electric	Gas	Total
Nonresidential Equipment	\$3,099,649	\$268,582	\$3,368,231
Small Commercial Energy Audit	\$598,055	\$671,925	\$1,269,980
Low-Income Nonresidential (IFA)	\$18,771	\$62,963	\$81,734
Commercial New Construction	\$0	\$0	\$0
Nonresidential Load Management	\$7,550,912	\$0	\$7,550,912
Efficiency Bid	\$749,225	\$4,276	\$753,501
Nonresidential Energy Analysis	\$1,148,357	\$132,102	\$1,280,459
Nonresidential Custom	\$387,686	\$580,727	\$968,413
Totals	\$13,552,655	\$1,720,575	\$15,273,230

Percentage of spending on buildings over 5 years old = 75%.

Buildings under 5 years old

Program	Electric	Gas	Total	2006 Grand Totals
Nonresidential Equipment	\$251,323	\$15,631	\$266,954	\$3,635,185
Small Commercial Energy Audit	\$48,491	\$39,105	\$87,596	\$1,357,576
Low-Income Nonresidential (IFA)	\$0	\$0	\$0	\$81,734
Commercial New Construction	\$3,977,006	\$461,595	\$4,438,601	\$4,438,601
Nonresidential Load Management	\$180,490	\$0	\$180,490	\$7,731,402
Efficiency Bid	\$0	\$0	\$0	\$753,501
Nonresidential Energy Analysis	\$93,110	\$7,689	\$100,799	\$1,381,258
Nonresidential Custom	\$31,434	\$33,798	\$65,232	\$1,033,645
	\$4,581,854	\$557,818	\$5,139,672	\$20,412,902

Percentage of spending on buildings under 5 years old = 25%.

MidAmerican Notes:

1. These numbers are inclusive of all categories of program spending.
2. Nonresidential Equipment was derived by taking the percentage of customer rebates for new and replacement equipment and applying that percentage to total program spending in 2006. It is assumed that all new equipment is going into new buildings. This probably overstates the percentage of spending into buildings less than 5 years of age because existing facilities can purchase new instead of replacement equipment too. MidAmerican does not track the age of the facility participating in the program so this estimate which to some unknown extent overstates spending in buildings less than 5 years of age is the best we can do.

3. Small Commercial Energy Audit numbers are based on the ratio of new vs. replacement spending in nonresidential equipment. Since MidAmerican does not track the age of buildings that participate in programs, this is the best proxy we have to estimate. Again, this probably places too much spending in buildings under 5 years of age.
4. By definition, all nonresidential low-income spending is in older buildings.
5. Nonresidential Load Management numbers are based on a review of contracts and knowledge of these fewer and larger customers.
6. Nonresidential Energy Analysis numbers are based on the ratio of new vs. replacement spending in nonresidential equipment. Since MidAmerican does not track the age of buildings that participate in programs, this is the best proxy we have to estimate. Again, this probably places too much spending in buildings under 5 years of age.
7. Nonresidential Custom numbers are based on the ratio of new vs. replacement spending in nonresidential equipment. Since MidAmerican does not track the age of buildings that participate in programs, this is the best proxy we have to estimate. Again, this probably places too much spending in buildings under 5 years of age.

2. Alliant/IPL Residential EE Incentive Spending in 2006 - Older vs. Newer Homes

Older Homes (built before 1995)

Program	Electric	Gas	Total
Residential Equipment	\$2,885,241	\$2,460,574	\$5,345,815
Residential Audit	\$602,403	\$1,062,876	\$1,665,279
Low-Income	\$344,365	\$1,762,805	\$2,107,170
Residential New Construction	\$0	\$0	\$0
Residential Load Management	\$1,851,082	\$0	\$1,851,082
Totals			\$10,969,345

Percentage of spending on homes over 5 years old: 81%

Newer Homes (built 1995 to present)

Program	Electric	Gas	Total	2006 Grand Totals
Residential Equipment	\$470,368	\$135,711	\$606,079	\$5,951,894
Residential Audit			\$0	\$1,665,279
Low-Income			\$0	\$2,107,170
Residential New Construction	\$1,122,932	\$800,600	\$1,923,532	\$1,923,532
Residential Load Management	\$97,425	\$0	\$97,425	\$1,948,507
			\$2,627,036	\$13,596,382

Percentage of spending on homes under 5 years old: 19%

3. Aquila Distribution of Costs – Older vs. Newer Structures

Aquila's authorized EE programs include \$383,416 for Residential New Construction, which represents 13.7 percent of total planned expenditures. Aquila does not separate spending by the age of the premises.

What percent of eligible businesses, institutions, and residences participate in utility programs? If the assumption is that a business, institution or residence will participate only once in a program, the answer will not be meaningful. It is very possible for a utility customer to participate multiple times in a utility's EE programs, depending on how many EE measures the customer installs at a given time. Businesses are especially likely to participate multiple times in EE rebates, because they will not likely replace all of their energy using equipment or building components at the same time. However, new homes and businesses are likely to participate only once because they would probably install very high efficiency building components and equipment at the time of construction, and thus need no further improvements for years or decades into the future.

Load Management

How do load management programs work?

Alliant/IPL Load Management Programs—2006 (from Alliant/IPL Energy Efficiency Annual Report for 2006)

Load Management — Residential: IPL's Appliance Cycling Program runs from May 15 to September 15. During a cycling event, IPL shuts off a participant's air conditioner compressor for fifteen minutes out of every half hour and then returns the compressor to the individual's thermostatic control for the other 15 minutes of the half hour. The duration of the on and off cycling event is typically six hours (1 p.m. to 7 p.m.), and never on weekends or holidays. At 11 a.m. each morning, IPL reviews the hourly forecast up through 7 p.m. for each of its zones on Weather.com. If a specific zone forecast meets a temperature trigger, the cycling process begins. Participants receive incentives for allowing IPL to control their central air conditioners and/or electric water heaters.

Successes:

- IPL cycled at least one zone on June 16, July 17, 31, August 1 and 2. On July 31, the entire residential program was cycled. Approximate impact was 20 MW when all zones were cycled.
- 43,951 customers are participants in the program as of December 31, 2006.
- Due to communication system improvements, IPL expects to achieve approximately 24 MW in 2007.

Challenges:

- Timely replacement of switches due to customer availability and contractor resources.
- Installation and implementation of new Yukon system to replace the outdated IBM OS2 system.

Load Management – Interruptible: The interruptible program is available to large commercial and industrial customers who can curtail at least 200 kW of load to reach a predetermined, contractual, firm load amount within a specific timeframe. Program participants earn incentives, in the form of bill credits, in return for reducing energy usage when asked by IPL. Participants who fail to meet their contractual firm demand level are financially penalized.

Successes:

- Completed collaboration with the OCA and intervening parties and received Board approval on a redesigned interruptible program that is compatible with MISO Day 2 market conditions—pursuant to the Settlement approved by the Board on April 27, 2005.
- Received Board approval on a redesigned tariff and EE plan modification that address concerns expressed in the Board's October 27, 2005, Order regarding program cost and use or implementation.
- Implemented new decision rules, which produced interruption events called to meet the EE condition of reducing peak demand.

Summary of Interruptible Curtailments (After New Decision Rule)

Curtailment Detail	07/17/06	07/19/06	07/28/06	07/31/06*
Start Time	1:00 pm	3:00 pm	2:00 pm	11:00 am/12:00 pm
Stop Time	7:00 pm	7:00 pm	6:00 pm	7:00 pm/8:00 pm
Decision Rule Condition**	2	2	2	1
# of Customers Called (current total equals 154)	66	71	40	154
Buy-Through Available	Yes	Yes	Yes	No
# of Customers Who Selected Buy-Through	5	2	0	N/A
MW IPL Called to Curtail (max available: 263 MW)	151	76	102	263
MW Bought Through	53	2	0	N/A
# of Customers Penalized	1	5	0	2

* Some customers were called to curtail from 11:00 am until 7:00 pm;
other customers were called to curtail from 12:00 p.m. until 8:00 p.m.

** Condition 1 = Reliability

Condition 2 = Energy Efficiency—Reducing Peak Demand

Condition 3 = Energy Efficiency—Reducing Energy Usage
Condition 4 = Program Quality Control

MidAmerican Energy Load Management Programs

Residential Load Management:

Load Management – Residential: MidAmerican's residential load control program, known as SummerSaversm, runs from June 1 to September 30. During a cycling event, MidAmerican shuts off a participant's air conditioner compressor for fifteen minutes out of every half hour and then returns the compressor to the individual's thermostatic control for the other 15 minutes of the half hour. The on and off cycling event is typically five hours (2 p.m. to 7 p.m.), and never on weekends or holidays.

MidAmerican decides when to run SummerSaver based on anticipated electric load for any given day. Participants receive a \$40 bill credit for their first year of participation and a \$30 bill credit for subsequent years for allowing MidAmerican to control their central air conditioners or air-source heat pumps.

Successes:

- MidAmerican cycled 4 days in 2007 and 5 days in 2006. Over the last 10 years, the average days cycled is 8.
- As of December 31, 2006, MidAmerican had 55,322 participants in the program.
- In 2007, MidAmerican anticipated receiving about 51 MW in load reduction when cycling occurs on a very hot day (95° F or higher).

Challenges:

- Maintenance of aging infrastructure.
- Finding installation contractors willing to install and service load control receivers in remote areas with smaller population.

Nonresidential Load Management: The Curtailment Program, provides large nonresidential customers with financial incentives to reduce electricity use during system peak hours. Customers use one or more of three strategies to reduce demand by at least 250 kW when signaled to do so: (1) Shed load completely, without replacement; (2) shift load to nonpeak periods and/or (3) generate power on-site.

This is a mature program, as MidAmerican and its predecessors have offered it for many years, and most participants have been involved for multiple years.

MidAmerican's Nonresidential Load Management program contractually obligates participants to drop an agreed-upon amount of electric load when signaled in exchange for a financial incentive. Clear guidelines and requirements for participation are provided in tariffs specifying notice requirements, number of

curtailments, and other program procedures. Curtailment requests are limited to a total of 16 per season (June through September) with a maximum duration of six hours per event. Customers are offered either one-year or three-year contracts. New customers are limited to signing one-year contracts in order to confirm their ability to perform as required in this program. Returning participants who have performed as required in prior years are offered the option of a three-year contract with a higher incentive per kilowatt.

MidAmerican provides information to customers regarding curtailments, curtailment strategies and analysis of load data via energy consultants, and a Web site. Customers also are offered the use of MidAmerican's Curtailment Manager, an Internet-based software system that provides notice of curtailments events, allows monitoring of performance in near-real time, and includes access to data and energy analysis modules on a year-round basis to help customers actively manage energy use. Each participant's performance is evaluated at the end of the curtailment seasons. Incentives then are paid to those participants who met contractual requirements.

MidAmerican has 135 participants in the curtailment program with a kW impact of 185,286 kW. The total contract incentives are \$6,950,927.01.

What are the pluses and minuses of the load management programs?

Pluses: Load management programs obtain valuable peak load capacity from customers of utilities, who agree to shift their energy use away from peak periods when called on to do so. Although electric system peak loads may only occur for several hours in a given year, and may not recur for several years, the strain on utility systems at the time of peak load is worrisome to utility managers and the monetary value of peak electricity obtained from load reductions can be many times the normal value of electrical energy.

Customers receive value from incentives in the form of rate discounts or payments. IOUs pay incentives that are a fraction of the estimated cost of the utility to buy the capacity in the wholesale market or to invest in more peak electric generators. Customers determine how much of their load can be switched off or shifted to self-generation.

The ability to reduce load is also valuable to help utilities manage non-peak electric system emergencies. Iowa utilities have requested load management reductions from customers to deal with ice storms requests from the Midwest Independent System Operator (MISO) to help manage electrical transmission problems.

Minuses: Load management incentives must be paid each year to maintain the capability to reduce load, even if there are no interruptions in a given year.

Unlike EE peak load savings, load management peak electrical savings depend on the will and ability of customers to actually make load reductions, sometimes on short notice. Customers who manage load by shifting to self-generation usually start up their own diesel-fired generators, which may produce more air emissions than utility natural gas fired peaker plants. However, the number of hours and megawatts involved is usually a tiny fraction of the total annual megawatt-hours for a utility system.

How much money are we spending on these programs by each utility?

Program Name	Utility	Cumulative Actual MW	Utility Cost
Residential Load Management - DLC	Alliant/IPL	24,430	2,255,118
Non-Res Load Management - Interruptible	Alliant/IPL	254,811	22,354,296
Residential Load Management	MEC	50,376	2,922,182
Nonresidential Load Management	MEC	171,885	7,731,402

Who is participating in these programs? How are the participants selected? Is participation on a competitive basis, or can anyone participate? Would competitive bidding work? Participant identity is highly confidential customer information. The limited number of participants in load management makes even the identification of types of customers sensitive information.

Participation in both residential and nonresidential load management programs is voluntary. Nonresidential programs have threshold limits, such as customer monthly kW load, limiting these programs to larger customers. Competitive participation has been discussed, but the small pool of potential participants and the costs of conducting competitive selection have been cited by utilities as reasons for not pursuing such options.

How can load management programs be made more cost-effective?

IOU load management programs could pay customers lower incentives, at the risk of losing significant numbers of peak MW savings.

The Alliant/IPL Interruptible program is noteworthy for the implementation of new rules which caused Alliant/IPL to interrupt customers more often than in the recent past. However, a number of Alliant/IPL customers dropped out of the program in 2006, reducing the peak MW available for interruption.

Contractors and Workers

Who are the contractors that deliver the EE services on behalf of the utility companies? How are they chosen? What are their qualifications?

MidAmerican Energy Efficiency Program Delivery Contractors:

- A-TEC Energy Corp.
 - Home energy audits (scheduling and delivery)
 - Small commercial energy audits
 - Residential load control implementation
 - A-TEC sub-contracts with local electrical firms and heating & cooling contractors to obtain load control receiver installation and maintenance services.
 - Residential and nonresidential rebate processing
- First American Bank
 - EnergyAdvantage Financing
- The Weidt Group
 - Commercial New Construction
- The Energy Group
 - Small commercial audits
 - Nonresidential Custom
 - Multi-family low income audits (IFA Program)
- Nexant, Inc.
 - Efficiency Bid
 - Nonresidential Energy Analysis
- Quantec, LLC
 - EnergyWise Home Savings Kit program for LIHEAP eligible customers
 - Provides training to community action agencies
 - Supplies kits to community action agencies
- Iowa Department of Human Rights and community action agencies
 - Low-Income Weatherization
 - Delivery of Energy Wise Home Savings Kits and energy efficiency education training to low income customers
- Iowa Department of Natural Resources
 - Plant some shade (residential tree planting program)
 - Trees for Kids/Trees for Teens
- Nexus, Inc.
 - On-line energy audit services
- Wisconsin Energy Conservation Corp.
 - Change-a-light, change-the-world (CFL in-store rebate program)

Contractors are chosen through a Request for Proposal (RFP) process based on qualifications and cost. This is not used for state agencies.

MidAmerican's EE Department has 16 full-time equivalents and works with 10 program implementation contractors, listed above. 14 subcontractors work directly for and contract with A-TEC in residential load control. These subcontractors do not contract with MidAmerican.

Private contractors work throughout MEC's Iowa service territory and may work with other investor owned, municipal and rural electric utilities. If there is overlap in a community, the utilities work to avoid duplication of services. For example, in Cedar Rapids, MidAmerican's gas service overlaps with IPL's electric service. In this case, the utilities work together and agree that the heating energy provider will perform the home energy audit. When the audit is performed, all electric measures are installed. The electric provider, in this case IPL, reimburses the gas provider, in this case MidAmerican, for the costs of the electric measures. In Council Bluffs, Aquila provides the gas and MidAmerican the electric, so the arrangement is reversed. MidAmerican maintains similar arrangements with several municipal utilities as well.

Alliant/IPL Energy Efficiency Contractors:

Program	Contractors	How Chosen	Qualifications	Overlap?
Residential Prescriptive Rebates	A-TEC verifys random sample	RFP bid	1	No
Change-a-Light, Change-the-World	Wisconsin Energy Conservation Corp	Bid	2	Statewide
Residential Appliance Recycling	Conservation Services Group (CSG)	RFP bid	3	No
Residential Home Audits	A-TEC provides audits	RFP bid	1	No
On-Line Energy Audit	Nexus provided website software	Bid	4	No
Residential New Construction-Builder Option Package	A-TEC provides inspections	RFP bid	1	No
Residential New Construction-Energy Star	HERS Rater hired by builder	NA		NA
Non-Residential Custom Rebates	Michael's Engineering provides some calculations for rebate pre-approval	RFP bid	5	No
Non-Residential Performance Contracting	Michaels Engineering provides some calculations for pre-approval, kW Engineering provides verification	RFP bid	5, 6	No
Non-Residential Prescriptive Rebates	A-TEC verifys random sample	RFP bid	1	No
Non-Residential Comm New Construction	The Weidt Group provides consultation services	Coordination with other utilities	7	No
Agriculture	NA	NA		NA
Low Income Weatherization	Department of Human Services and CAP agencies provide services	Sole Source	8	Statewide
Low Income Multi-Family Pilot	The Energy Group-Iowa Finance Authority	Sole Source	9	Statewide
Low Income Energy Education	Quantec provides kits and teaching aids	Statewide Contract	10	Statewide
Residential Load Management	Canon and Comverge provide software	Bid Process		No
Non-Residential Load Management (Interruptible)	Power Manager provides software	Bid Process		No

Trees	IDNR and Trees Forever	RFP Bid	11, 12	Statewide
Monitoring and Evaluation (All Programs)	Summit Blue, Michael's Engineering but mostly KEMA provide process and impact evaluations	RFP bid	13	

Alliant/IPL Notes:

- 1) A-TEC has certified energy auditors and over 15 year's of experience in the auditing field.
- 2) WECC is a DSM administrator coordinating the CAL-CTW program in a multi-state area.
- 3) Conservation Services Group (CSG) recycles and demanufactures all appliances collected through this program at its Cedar Rapids facility. The location processes an average of 1,500 units per month with the capability of recycling more than 3,000 per moth. CSG utilizes the facility in accordance with all applicable federal, state and local laws, rules, regulations and orders, including but not limited to those of the US Environmental Protection Agency, the US Department of Transportation, the Iowa Department of Natural Resources, and state and federal Occupational Safety and Health Authorities.
- 4) Nexus Energy software provides on-line energy audit services for multiple utilities.
- 5) Michael's Engineering has professional engineers (PEs) and over 20 years experience in energy efficiency.
- 6) kW Engineering has professional engineers who specialize in energy efficiency evaluation.
- 7) The Weidt Group has professional engineers and architects who have worked with energy efficiency for over 20 years. They offer training to their peers in efficiency.
- 8) The Iowa Department on Human Services functions as the liason with community action agencies to provide energy efficiency services to low-income Iowans.
- 9) Iowa IOUs have coordinated with these Iowa agencies to expand the low-income effort.
- 10) National consultant, chosen as part of 2001 EEP plan review.
- 11) Iowa Department of Natural Resources provides trees for areas needing help due to storms or other short term needs.
- 12) Trees Forever is a statewide non-profit agency that works with all cities within IPL's service territory to establish tree projects.
- 13) KEMA and Summit Blue are national consultants specializing in EE program planning, design and evaluation. The KEMA evaluations for IPL were provided by KEMA's Madison, WI office by economists, engineers, accountants and social scientists.

****Plus, IPL has 2,010 trade allies who act as an extension of IPL to promote the programs and/or install the energy efficient equipment.**

Aquila's Energy Efficiency Contractors:

- A-TEC Energy (rebate processing and residential and commercial energy audits)
- GA Ernst and Company (residential and commercial energy audits)
- Resource Action Programs (School-Based Energy Education Program)
- The Energy Group (Low-Income Multifamily Program)
- Trees Forever and the Iowa DNR (Trees Programs)
- Quantec LLC (Low-Income Energy Education)
- Midwest Energy Efficiency Alliance (BOC Training)
- Applied Energy Group (C/I Custom Rebate analysis)

Our database also includes 587 HVAC dealers and homebuilders that help promote and implement our programs.

